

## High Char Flexible Polymers, Phase I

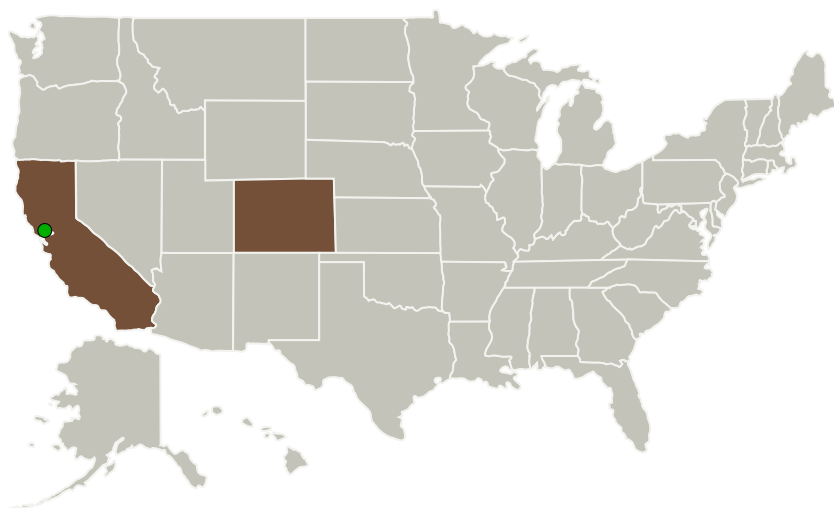
Completed Technology Project (2016 - 2016)



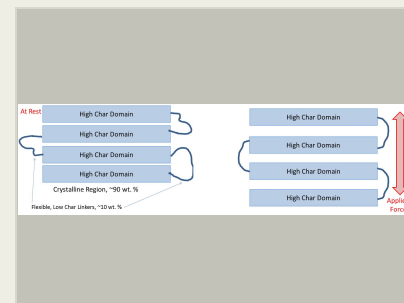
## Project Introduction

TDA Research is proposing to chemically modify the polymer backbone of polymers known to have char yields upwards of 70% at 800+ °C (under inert gas) in order to make the polymers flexible, and possibly elastomeric at or near room temperature. Flexibility is a result of easy rotation around the bonds within a polymer backbone, maintained only in the presence of low crosslink density. Conversely, a high char yield requires very robust bonding, generally with high crosslink density, since floppy, easily broken bonds lead to the evolution of gas, reducing the residual mass. Our modifications will reduce the char yield, but, in this case, even a 10% loss in char yield would still be comparable to the char yield of the inflexible phenolic resins currently in use.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
TDA Research, Inc.	Lead Organization	Industry	Wheat Ridge, Colorado
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California



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## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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## Primary U.S. Work Locations

California

Colorado

## Project Transitions

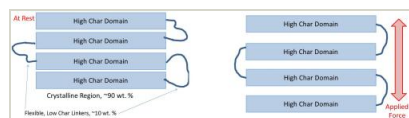
**June 2016:** Project Start

**December 2016:** Closed out

### Closeout Documentation:

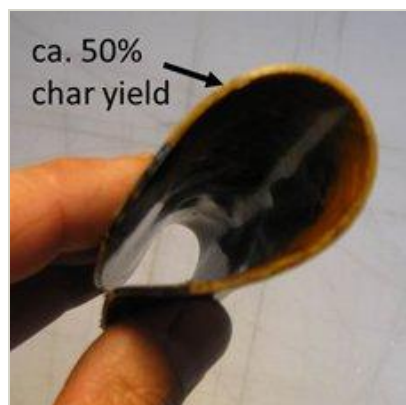
- Final Summary Chart(<https://techport.nasa.gov/file/139775>)

## Images



### Briefing Chart Image

High Char Flexible Polymers, Phase I  
(<https://techport.nasa.gov/image/136229>)



### Final Summary Chart Image

High Char Flexible Polymers, Phase I Project Image  
(<https://techport.nasa.gov/image/131605>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

TDA Research, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

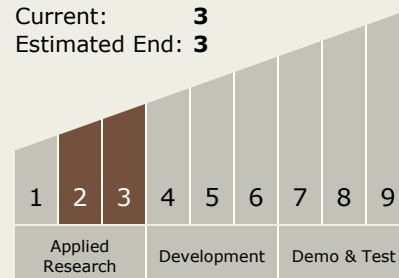
Carlos Torrez

### Principal Investigator:

Michael Diener

## Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



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## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.1 Materials
    - └ TX12.1.3 Flexible Material Systems

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System